Research Report
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# A-A HIGHWAY SAFETY STUDY

by

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## EXECUTIVE SUMMARY

The objective of this study was to review the roadway characteristics, existing conditions (sight distances, traffic control, etc.), and crash history of the A-A Highway and recommend improvements or countermeasures. The A-A Highway extends along KY 9 from Grayson in Carter County to I 275 in Campbell County over a length of 111.2 miles and along KY 10 from KY 9 in Lewis County to US 23 in Greenup County over a length of 24. 6 miles. Almost all of the road is two lane with three lane sections for passing on grades. Four to five miles in Mason County at Maysville and about 18 miles in Campbell County are four lane. The entire highway, except for about three miles, has a speed limit of 55 mph.

The analysis of crashes occurring on the A-A Highway resulted in the conclusion that this road does not have a high number or rate of total crashes when compared to Kentucky statewide statistics for similar types of roads. The overall fatal crash rate was less than average with the exception of two of the seven counties the highway passes through. The low overall crash rate can be attributed to the general design of the road with 12-foot lanes, full width shoulders, good clear zones, no sharp curves, and passing lanes in areas with steep grades.

The rate of fatal crashes in Lewis and Mason Counties were higher than the state average. Spots, sections, or intersections having the highest numbers of crashes were investigated. Considering all crashes, the major difference compared to all crashes in the state was a high percentage of deer-related crashes occurring on the A-A Highway. When fatal crashes were considered, the percentage of angle crashes at intersections was found to be high when compared to statewide statistics. There were also several head on fatal collisions occurring when a driver fell asleep.

Possible countermeasures to address the most common types of collisions were noted. The typical signing has been provided at intersections with the addition of flashing beacons installed at several locations. Oversized guide signs have been installed at several intersections. The major type of crash, especially injury crashes, at intersections involved right angle collisions. Possible countermeasures to address the angle collisions at intersections would include: a) placing stop bars at all intersections and verifying that all stop bars are located at a position which provides maximum visibility for the driver of the stopped vehicle, b) placing additional warning signs on the A-A Highway in advance of the intersections with speed advisories to lower speeds, c) using an active warning system which would involve installing warning flashers on the intersection warning signs for traffic on the A-A Highway with the flashers activated when a vehicle is stopped on the side road, d) attempting to reduce the approach speeds on the A-A Highway with rumble strips or transverse stripes placed at decreased spacing as drivers approach the intersection, and e) attempting to reduce speeds on the A-A Highway approaches to the intersections by using "traffic calming" techniques such as reducing the approach lane width with a striped or mountable island, and f) reducing the number of conflict points and eliminating the most hazardous conflicts through either a new intersection design or restricting certain turning movements.

A possible countermeasure for the crashes involving a vehicle crossing the center of the road into the opposing lane would be a method of alerting drivers that their vehicle was proceeding out of their lane and had encroached onto the centerline of the road. Centerline rumble strips have been used in other states for this purpose. Shoulder rumble strips have been provided along much of this road for the purpose of alerting drivers that they have crossed the edgeline. Shoulder rumble strips should be added at locations where they are not presently installed. While centerline rumble strips present more design problems compared to those used on the shoulder, their use should be strongly considered on a trial section of the A-A Highway to determine the feasibility of more widespread use.

A countermeasure for deer related crashes would be reflectors designed to deter the movement of deer across the road. A test section of the A-A Highway should be selected to determine the effectiveness of this type of device. Locations with the highest number of this type of crash have been identified.

The percentage of crashes in which unsafe speed has been listed as a contributing factor is lower on the A-A Highway compared to statewide statistics for two-lane rural highways. The roadway geometrics allow drivers to travel above the 55 mph speed limit. The speed limit should not be reduced. A previous study recommended a maximum speed limit on this type of road of 60 mph for cars and 55 mph for trucks. Increased enforcement is an option near the intersections having the highest number of crashes. Placement of permanent active signs displaying the speed of the motorist at these intersections is another option.

In summary, the crash data for the A-A Highway show that it has a low crash rate, compared to similar roads in Kentucky, with a few areas where improvements or changes could be recommended. It should be noted that there are numerous other two lane roads with a greater need for more significant improvements. This type of two lane road, with good roadway geometrics and cross-section, promotes efficient travel with the potential for increased speeds. The at-grade intersections and the possibility of a driver drifting across the centerline results in the potential for severe right angle or head on collisions. Recommendations were made to address these types of conflicts and resulting crashes; however, right angle and head on collisions cannot be completely eliminated considering the practical alternatives available.

# 1.0 INTRODUCTION

As directed by Legislative action, a traffic safety study for the A-A Highway was to be conducted in fiscal year 1999-2000. An excerpt from the 1998-2000 budget and the Budget Memorandum included the following language related to the scope and direction of the study:

> "The Department of Highways shall conduct an intensive traffic accident study on the A-A highway in fiscal year 1999-2000. It shall include an analysis of visibility, signage, lighting, turn lanes, and road striping at each public and private access. The accidents shall be identified by location and by fatalities, major injury, noninjury, and minor injury. Causes for the accidents shall be summarized and recommendations made to reduce the high level of accidents on the A-A highway. A public hearing shall be held on the results of the study at a convenient location along the A-A Highway Corridor."

Therefore, the objectives of this study were to: a) review the crash history of the A-A Highway to determine the number and rate of crashes, b) identify any high-crash locations, c) determine the characteristics of crashes occurring on this highway, and d) review the roadway characteristics and existing conditions (sight distances, traffic control, etc.) on the highway, and e) recommend countermeasures to address the types of collisions found in the analysis.

# 2.0 PROCEDURE

## 2.1 DESCRIPTION OF HIGHWAY

The Highway Information System (HIS) computer file was used to summarize the basic characteristics of the A-A Highway. This included such information as number of lanes, lane width, and shoulder width.

## 2.2 CRASH ANALYSIS

An analysis of all crashes occurring on the A-A Highway in the three-year period of 1996 through 1998 was conducted. In addition to those years, data for fatal crashes from 1995 through the available months of 1999 were obtained. A computer analysis was used to determine the location and characteristics of crashes occurring on the A-A Highway. Average crash rates were calculated and compared to statewide rates to determine sections of the highway where rates were above the statewide average. An analysis was conducted to determine specific locations which exhibited high numbers and rates of crashes. The characteristics of all the crashes as well as fatal crashes on the A-A Highway were compared to statewide statistics to determine differences which could be used to identify general problem areas.

## 2.3 ROAD SAFETY REVIEW

The roadway was driven with an objective of conducting a general inspection as well as a more specific observation of features which affect safety. The crash analysis was reviewed to determine areas of possible interest. The review included an inspection of specific locations which had experienced several crashes as well as a general review of the entire road.

The purpose of a road safety audit is to examine a project's accident potential and safety performance. Typically, auditing is applied to road and traffic designs before they are built although the process can be applied to existing roads by conducting an in-service audit. In addition to a general review, an inventory of various roadway features was conducted. The general areas included in the review were: public and private access, intersection traffic control, visibility and sight distance, surface condition, shoulder design, signs and markings, and roadside hazards. An emphasis was placed on data relating to access points (intersections with state county, and city roads and entrances to public and private property).

# 3.0 RESULTS

## 3.1 DESCRIPTION OF HIGHWAY

The A-A Highway provides a link between northern and northeastern Kentucky (Figure 1). The name is derived from the ends of the road which are near Ashland and Alexandria. The road consists of a 111.2-mile section of KY 9 from Grayson in Carter County to I 275 in Campbell and a 24.6 mile-section on KY 10 from KY 9 in Lewis County to US 23 in Greenup County.

The total length of 135.8 miles is on the National Highway System. The functional classification of all the miles is principal arterial. All but about 15 miles is classified as rural. There is about five miles classified as urban in Mason County at Maysville and about 10 miles in Campbell County.

The majority of the road is two lane with three lane sections for passing lanes. There is a 4.5 mile section of four lane in Mason County at Maysville. Also, the 18 miles in Campbell County are four lane. With the exception of less than one mile in Mason County (at Maysville) and about 1.5 miles in Campbell County (near I 275), the speed limit is 55 mph. The lane width is 12 feet. With the exception of a section of about 1.6 miles of curb and gutter in Maysville, the remainder of the road has 10 to 12 foot paved shoulders.

The maximum ADT is about 28,000 on the four lane section near the I 275 interchange in Campbell County. The lowest ADT is under 1,000 on portions of KY 10 in Lewis County. The average ADT for the total length is about 7,000. There was a limited amount of information available relating to truck volumes. Traffic count data from Lewis County showed three percent single unit trucks and five percent combination trucks at this location.

There are no sharp curves which require a reduction in speeds substantially below the posted speed limit. There are curve warning signs and lower speed advisories for a few curves. Passing lanes are provided at numerous locations where there are long sections with a substantial grade. Fixed objects and steep slopes have either been removed or shielded. There are numerous at grade intersections. Access is controlled by permit. Roadway lighting is only provided at a few isolated locations.

## 3.2 CRASH ANALYSIS

All crashes occurring on the A-A Highway in the three-year period of 1996 through 1998 were analyzed and compared to statewide statistics. A comparison of crashes on the A-A Highway with all crashes and with crashes on two-lane rural highways is given in Table 1. The two-lane rural category was added since the majority of the A-A Highway is that type. The following is a discussion of this comparison.

| VARIABLE | COMPARISON |
|---|---|
| Severity | The percentage of fatal crashes on the A-A Highway was higher than for all two-lane rural roads. |
| Directional Analysis | The most dramatic difference was the extremely high percentage of animal related crashes on the A-A Highway when compared to the other categories. The percentage of ran- off- roadway and fixed object crashes were lower on the A-A Highway compared to all two-lane rural highways. The percentage of intersection crashes was higher than for all two-lane rural highways but lower than for crashes on all types of roads. |
| Time of Day | There was a higher percentage of crashes between 6 pm and 6 am on the A-A Highway. |
| Day of Week | The percentages were very similar. |
| Month | There was a higher percentage of crashes on the A-A Highway in September through November. This could be related to data which show that these months have the highest number of deer related crashes. |
| Number of Vehicles | The percentage of single vehicle crashes was close to that for two-lane rural roads but much higher than that for all crashes. |
| Land Use | The majority of crashes on the A-A Highway was in a rural area. |

| VARIABLE | COMPARISON |
|---|---|
| Road Surface Conditions | The percentages were very similar. |
| Weather | The percentages were very similar but the percentage involving "fog/smog/smoke" was highest on the A-A Highway. |
| Road Character | There was a higher percentage of crashes on straight sections of road on the A-A Highway. |
| Type Accident 1st Event | The percentages involving deer and guardrail were much higher on the A-A Highway. |
| Contributing Factors | Considering human factors, crashes on the A-A Highway had a lower percentage involving unsafe speed and a higher percentage involving falling asleep. Animal action (apparently deer) was a particularly high factor on the A-A Highway. |
| Light Condition | Crashes on the A-A Highway had a higher percentage during non-daylight hours. |
| Speed Limit | The speed limit was 55 mph at most crash locations on the A-A Highway. |
| Vehicle Type | There was a higher percentage of crashes involving both single unit and combination trucks on the A-A Highway. |

A comparison was also made of fatal crashes on the A-A Highway with all fatal crashes and fatal crashes on two-lane rural highways. These data are given in Table 2. The following is a discussion of this comparison of fatal crashes.

| VARIABLE | COMPARISON |
|---|---|
| Directional Analysis | There was a substantially higher percentage of intersection crashes, especially angle crashes, on the A-A Highway. There were much lower percentages of fixed object and ran off roadway crashes. |
| Time of Day | There was a higher percentage of crashes between noon and 6 pm on the A-A Highway. |
| Day of Week | There was a slightly higher percentage of weekend crashes on the A-A Highway. |

| VARIABLE | COMPARISON |
|---|---|
| Month | There was a higher percentage during March through May and a lower percentage during June through August on the A-A Highway. |
| Number of Vehicles | There was a much lower percentage of single vehicle crashes and a much higher percentage of two-vehicle crashes on the A-A Highway. |
| Land Use | Almost all the crashes on the A-A Highway were in a rural area. |
| Road Surface Conditions | There was a slightly lower percentage during non-dry conditions on the A-A Highway. |
| Weather | There was a slightly lower percentage during inclement weather on the A-A Highway. |
| Road Character | The percentage on the A-A Highway on curves was much lower. |
| Type Accident 1st Event | There was a much higher percentage involving other vehicles on the A-A Highway but a much lower percentage involving a fixed object (with none involving a tree as compared to over 10 percent on other roads). |
| Contributing Factors | Crashes on the A-A Highway had a higher percentage involving failure to yield, falling asleep, improper turn, and improper passing with a lower percentage involving unsafe speed and alcohol. The only roadway factor noted was slippery surface and it was listed substantially less than the other categories. View obstruction was not listed as a factor in any crash. |
| Light Condition | There was a slightly higher percentage during daylight conditions on the A-A Highway. |
| Vehicle Type | There was a higher percentage involving both single unit and combination trucks on the A-A Highway. |

Computer records were used to identify all crashes occurring on the A-A Highway during 1996 through 1998. The number of injury and fatal crashes was also identified. Vehicle miles traveled were determined from the HIS file. The rates calculated using the crash and vehicle miles traveled are presented in Table 3. In addition to total rates, rates were calculated, by route, for each county. These rates were then compared to statewide statistics. The analysis shows that

almost all of the crash rates were lower than the comparable statewide average. Exceptions were the fatality rates in Lewis, Mason and Campbell Counties and the total rate in Campbell County. A detailed review of the crashes identified as occurring in the A-A Highway portion of KY 9 in Campbell County showed that a substantial number had incorrect milepoints and they actually occurred in the portion of KY 9 north of I 275. The total rate would be less if these crashes were removed from the rate calculation. This analysis showed that there has not been a problem with a high number of total crashes on the A-A Highway although there have been several fatal crashes in a few counties.

In a previous study of two-lane rural roads, one mile sections having critical numbers of crashes were identified. The critical number which was determined from the crash data was 10 crashes in one mile. Rates were then calculated for these one-mile sections with critical rate factors (CRFs) determined. Locations with a CRF of one or more were then inspected. Critical rate factors of 1.0 or greater are typically considered sufficiently high to be considered a potential problem.

There were six one-mile sections on the A-A highway with 10 or more crashes (Table 4) but all had very low CRFs due to the relatively high traffic volume on the A-A Highway compared to other two-lane rural roads. Crashes at five of the six sections were related to intersections in the section. For example, 11 of the 12 crashes at the section in Lewis County occurred at the KY 57 intersection. The only exception was the Pendleton County section where the major factor was a collision with a deer.

Since an emphasis of the analysis was to identify crashes occurring at intersections, the crash data were reviewed to identify intersections having the highest number of crashes. Following is a list of the intersections, by county, having the highest number of crashes in the time period from January 1, 1995 through September 30, 1999.

| COUNTY | INTERSECTION | NUMBER OF CRASHES |
|---|---|---|
| Carter - KY 9 | KY 2/7 | 6 |
| | KY 1959 | 3 |
| Lewis - KY 9 | KY 57 | 17 |
| | KY 59 | 3 |
| Lewis - KY 10 | KY 1306 | 2 |
| | KY 3311 | 2 |
| Greenup - KY 10 | KY 7 | 7 |

| COUNTY | INTERSECTION | NUMBER OF CRASHES |
|---|---|---|
| Mason - KY 9 | KY 11 | 20 |
| | US 68/62 | 18 |
| | Kenton Station Road | 11 |
| | KY 435 | 7 |
| | Medical Park Drive | 6 |
| | KY 1449 | 5 |
| | Market Square | 5 |
| | KY 10 | 4 |
| | Slack Pike | 4 |
| | KY 1237 | 3 |
| | KY 1448 | 3 |
| Bracken - KY 9 | KY 19 | 8 |
| | KY 875 | 4 |
| Pendleton - KY 9 | New Hope | 2 |
| Campbell - KY 9 | I 275 | 36 |
| | E. Alexandria Pike | 30 |
| | Pooles Creek | 17 |
| | Gloria Terra Drive | 15 |
| | US 27 | 12 |
| | Poplar Ridge | 7 |
| | KY 547 | 7 |

Collision diagrams were prepared for these intersections to determine if there was a pattern for the crashes. Following is a discussion of the analysis at some of the intersections which had the highest number of crashes.

| INTERSECTION | DESCRIPTION OF CRASHES |
|---|---|
| Carter; KY 9 - KY 2/7 | All of the six crashes were angle with all involving a westbound vehicle. There were four injury crashes and one fatal. Right of way is controlled by a stop sign on KY 2/7. |
| Lewis; KY 9 - KY 57 | Of the 17 crashes, 15 involved a right angle collision with 10 involving an injury and one a fatality. There was no concentration involving specific directions of travel. Thirteen were during daylight conditions. Right of way is controlled by a stop sign on the KY 57 approaches. |

| INTERSECTION | DESCRIPTION OF CRASHES |
|---|---|
| Greenup; KY 10 - KY 7 | Of seven crashes, six were right angle with two involving an injury and one a fatality. All six right angles crashes involved southbound and eastbound vehicles. Only one of the crashes occurred during darkness. Right of way is controlled by a stop sign on KY 7. |
| Mason; KY 9 - KY 11 | Of 20 crashes, 11 were rear end and seven were angle. A traffic signal is provided. The 11 rear end crashes were almost equally distributed between the two KY 11 approaches. There was no pattern for the angle collisions. |
| Mason; KY 9 - US 68/62 | Of the 18 crashes, eight were rear end and seven were angle. Right of way is controlled by a traffic signal. |
| Mason; KY 9 - Kenton Station Rd. | Of the 11 crashes, all were angle or opposing left turn. In almost all cases, one of the vehicles was westbound on KY 9. Right of way is controlled with a stop sign on Kenton Station Road. |
| Mason; KY 9 - KY 435 | Of the seven crashes, three were angle, three were rear end, and one was a single vehicle. The three angle collisions involved a southbound vehicle. Right of way is controlled by a stop sign on KY 435. |
| Mason; KY 9 - Medical Park Dr. | Of the six crashes, five were angle with three involving an injury. |
| Bracken; KY 9 - KY 19 | Of the eight crashes, six were right angle with four involving an injury. Five of the right angle collisions involved a southbound vehicle. Right of way is controlled by a stop sign on KY 19. |
| Campbell; KY 9 - I 275 | Of 36 crashes, 20 were rear end and nine were angle. Traffic signals control the right of way. |
| Campbell; KY 9 - E. Alexandria | Of 30 crashes, 12 were rear end and 12 were angle. A traffic signal controls right of way. |
| Campbell; KY 9 - Pooles Creek | Of 17 crashes, eight were rear end and four were angle. A traffic signal controls right of way. |

| INTERSECTION | DESCRIPTION OF CRASHES |
|---|---|
| Campbell; KY 9 - Gloria Terra Dr. | Of 15 crashes, eight were angle and four were rear end. Most of the angle accidents involved a left turning vehicle and a southbound vehicle. Right of way is controlled by a traffic signal. |
| Campbell; KY 9 - US 27 | Of 12 crashes, five were rear end and four were angle. Right of way is controlled by a traffic signal. |
| Campbell; KY 9 - Poplar Ridge | Of seven crashes, four were angle and two were rear end. |
| Campbell; KY 9 - KY 547 | There was no pattern in the seven crashes. Right of way is controlled by a stop sign on KY 547. |

A description of each fatal crash is given in the Appendix. The police report was obtained for all the fatal crashes. There were two common types of fatal crashes. The first type involved an opposite direction collision which occurred when a driver crossed the centerline into the path of an oncoming vehicle. While the reason was not always known, the opinion in several cases was that the driver fell asleep. The second type was an angle collision at an intersection. The driver on the side road would stop and then pull into the path of the vehicle on the A-A Highway. There were two intersections (KY 1237 and KY 11 in Mason County) on the two lane portion with two fatal collisions and one intersection (East Alexandria Pike in Campbell County) on the four lane portion with three fatal collisions. There were four rear end fatal crashes with all involving a collision into the rear of a truck.

## 3.3 ROAD SAFETY REVIEW

The review of the roadway features consisted of both general observations of the road obtained from driving the road and inspections of specific sites. Part of the review consisted of an inventory of traffic control and access. The roadway cross section was noted and specific high crash locations were inspected. A summary of the total number of access points was prepared (Table 5) using data obtained by driving the road and stopping at several of the intersections. The categories of access points are: a) intersection with state road; b) intersection with county/city road; c) public entrance; and d) private driveway. The data are summarized by county for each route.

A total of 347 access points were identified. The most common type was a private driveway followed by an intersection with a county or city road. There were 59 intersections with a state route with right of way controlled by a traffic signal at 11 of these intersections. An intersection beacon was installed at eight of the stop controlled intersections. Of the 170 intersections with state and local roads, the sight distance was under 1,000 feet at only nine with a minimum sight distance estimated to be about 600 feet.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

The analysis of crashes occurring on the A-A Highway leads to the conclusion that this road does not have a high number or rate of total crashes when compared to Kentucky statewide statistics for similar types of roads. The overall fatal crash rate was less than average with the exception of two of the seven counties the highway passes through. The low overall crash rate can be attributed to the general design of the road with 12-foot lanes, full width shoulders, good clear zones, no sharp curves, and passing lanes in areas with steep grades.

Two major types of fatal crashes have been identified. These types were: 1) angle collisions at intersections and 2) opposite direction collisions when a driver allowed his vehicle to cross the centerline. Several of the opposite direction collisions involved a driver falling asleep. When two lane roadways are rebuilt with improved geometrics and at-grade intersections, the result is higher speeds and a potential for severe angle collisions. A solution to these angle collisions is to construct interchanges rather than at grade intersections. However, as shown by the low crash rate on this highway, this is not a cost effective solution. While the improved roadway geometrics (curvature and grade) result in lower crash rates, drivers may not remain as alert on this type of highway, and if they allow their vehicle to drift across the centerline, severe opposite direction collisions can occur.

The typical signing has been provided at intersections with the addition of flashing beacons installed at several locations. Oversized guide signs have been installed at several intersections. The major type of crash, especially injury crashes, at intersections involved right angle collisions. Possible countermeasures to address the angle collisions at intersections would include: a) placing stop bars at all intersections and verifying that all stop bars are located at a position which provides maximum visibility for the driver of the stopped vehicle, b) placing additional warning signs on the A-A Highway in advance of the intersections with speed advisories to lower speeds, c) using an active warning system which would involve installing warning flashers on the intersection warning signs for traffic on the A-A Highway with the flashers activated when a vehicle is stopped on the side road, d) attempting to reduce the approach speeds on the A-A Highway with rumble strips or transverse stripes placed at decreased spacing as drivers approach the intersection, and e) attempting to reduce speeds on the A-A Highway approaches to the intersections by using "traffic calming" techniques such as reducing the approach lane width with a striped or mountable island, and f) reducing the number of conflict points and eliminating the most hazardous conflicts through either a new intersection design or restricting certain turning movements.

A possible countermeasure for the crashes involving a vehicle crossing the center of the road into the opposing lane would be a method of alerting drivers that their vehicle was proceeding out of their lane and had encroached onto the centerline of the road. Centerline rumble strips have been used in other states for this purpose. Shoulder rumble strips have been provided along much of this road for the purpose of alerting drivers that they have crossed the

edgeline. Shoulder rumble strips should be added at locations where they are not presently installed. While centerline rumble strips present more design problems compared to those used on the shoulder, their use should be strongly considered on a trial section of the A-A Highway to determine the feasibility of more widespread use.

When all crashes were considered, a very high percentage of deer related crashes were found. A countermeasure for this type of crash would be reflectors designed to deter the movement of deer across the road. A test section of the A-A Highway should be selected to determine the effectiveness of this type of device. Locations with the highest number of this type of crash have been identified.

The percentage of crashes in which unsafe speed has been listed as a contributing factor is lower on the A-A Highway compared to statewide statistics for two-lane rural highways. The roadway geometrics allow drivers to travel above the 55 mph speed limit. The speed limit should not be reduced. A previous study recommended a maximum speed limit on this type of road of 60 mph for cars and 55 mph for trucks. Increased enforcement is an option near the intersections having the highest number of crashes. Placement of a permanent active sign displaying the speed of the motorist at these intersections is another option.

In summary, the crash data for the A-A Highway show that it has a low crash rate, compared to similar roadways in Kentucky, with a few areas where improvements or changes could be recommended. It should be noted that there are numerous other two lane roads with a greater need for more significant improvements. This type of two lane road, with good roadway geometrics and cross-section, promotes efficient travel with the potential for increased speeds. The at-grade intersections and the possibility of a driver drifting across the centerline results in the potential for severe right angle or head on collisions. Recommendations were made to address these types of conflicts and resulting crashes; however, right angle and head on collisions cannot be completely eliminated considering the practical alternatives available.

**Figure 1. A-A Highway**

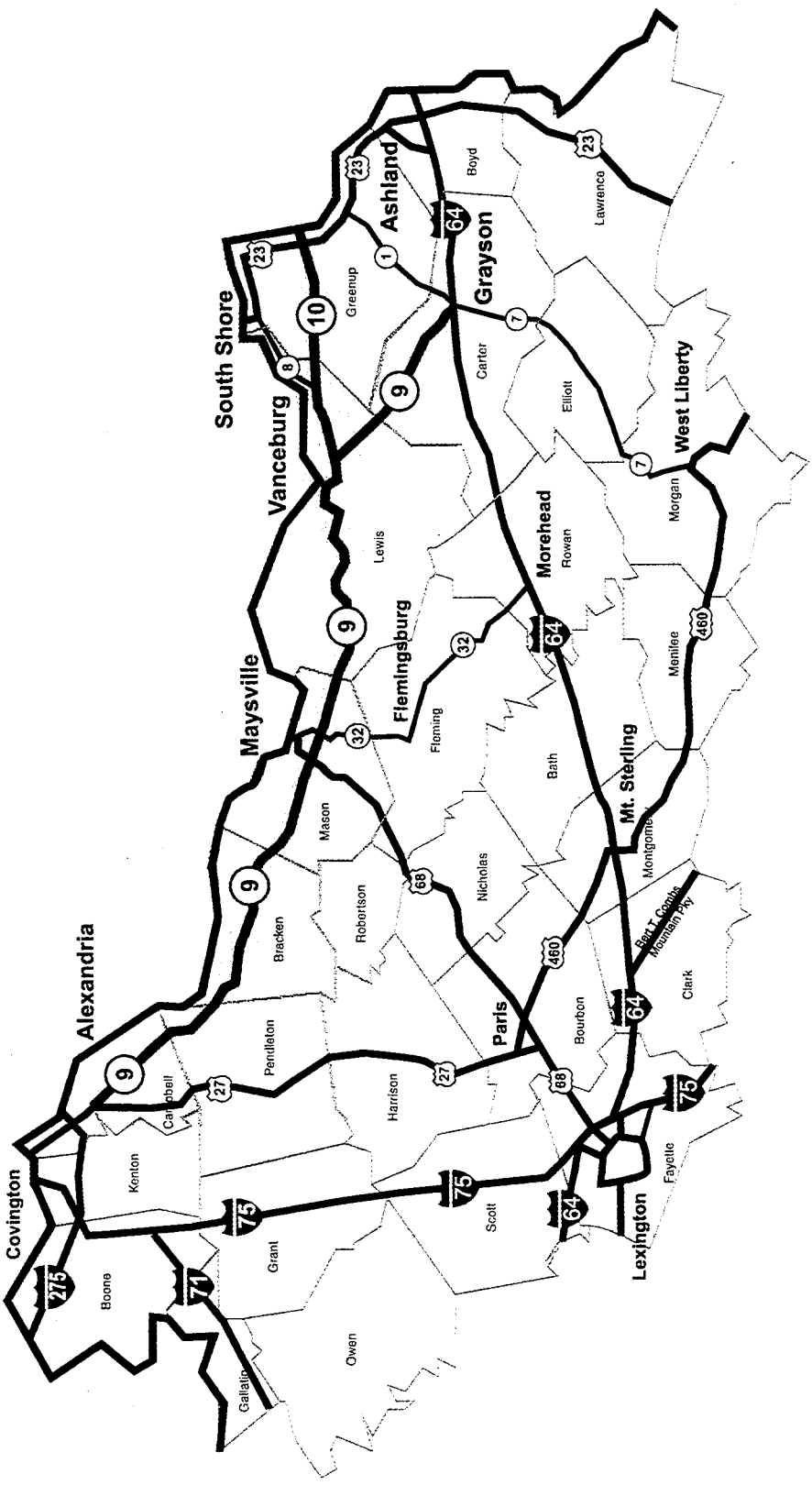

TABLE 1. COMPARISON OF CRASHES ON A-A HIGHWAY WITH ALL CRASHES AND CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998)

| | | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| VARIABLE | CATEGORY | ALL | TWO-LANE RURAL | A-A |
| Severity | Fatal | 0.58 | 1.24 | 2.71 |
| | Injury | 27.1 | 35.5 | 30.3 |
| Directional Analysis | Intersection | | | |
| | Angle | 16.3 | 10.1 | 12.7 |
| | Rear end | 10.9 | 5.65 | 8.72 |
| | Opposing left turn | 0.95 | 0.84 | 0.78 |
| | Fixed object | 1.29 | 1.15 | 0.87 |
| | Same direction sideswipe | 1.61 | 0.84 | 1.64 |
| | Bicycle | 0.25 | 0.04 | 0.29 |
| | Pedestrian | 0.27 | 0.27 | 0.39 |
| | All Intersection | 34.2 | 20.6 | 27.5 |
| | Non-Intersection | | | |
| | Rear end | 16.9 | 13.6 | 13.3 |
| | Head on | 0.80 | 1.28 | 0.78 |
| | Same direction sideswipe | 4.16 | 3.08 | 3.88 |
| | Opposite direction sideswipe | 5.68 | 8.52 | 4.36 |
| | Driveway related | 1.63 | 4.73 | 2.62 |
| | Parked vehicle | 7.02 | 2.43 | 2.62 |
| | Pedestrian | 0.61 | 0.45 | 0.48 |
| | Fixed object | 10.1 | 15.1 | 9.21 |
| | Ran off roadway | 6.17 | 14.1 | 6.01 |
| | Overturned in road | 0.96 | 1.92 | 2.13 |
| | Bicycle | 0.23 | 0.10 | 0.01 |
| | Animal | 3.58 | 8.19 | 19.7 |
| | Train | 0.07 | 0.95 | 0.00 |
| Time of Day | Midnight - 5:59 am | 7.35 | 8.79 | 12.0 |
| | 6:00 am - 11:59 am | 25.5 | 26.3 | 27.8 |
| | Noon - 5:59 pm | 45.3 | 40.9 | 32.0 |
| | 6:00 pm - 11:59 pm | 21.8 | 24.0 | 28.2 |
| Day of Week | Monday - Friday | 76.7 | 74.5 | 75.6 |
| | Saturday - Sunday | 23.3 | 25.5 | 24.4 |

TABLE 1. COMPARISON OF CRASHES ON A-A HIGHWAY WITH ALL CRASHES AND CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| | | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| VARIABLE | CATEGORY | ALL | TWO-LANE RURAL | A-A |
| Month | December - February | 24.4 | 24.4 | 24.1 |
| | March - May | 24.8 | 24.4 | 24.6 |
| | June - August | 24.3 | 24.0 | 21.0 |
| | September - November | 26.5 | 27.2 | 30.2 |
| Number of Vehicles | One | 24.9 | 43.1 | 42.3 |
| | Two | 69.2 | 53.0 | 52.9 |
| | More than two | 5.83 | 3.85 | 4.75 |
| Land Use | Rural | 34.4 | 72.6 | 66.2 |
| | Business/Industrial | 37.4 | 18.2 | 23.7 |
| | Residential/School/Park | 22.5 | 8.66 | 8.54 |
| | Limited Access | 5.44 | 0.43 | 1.46 |
| Road Surface Conditions | Dry | 71.5 | 68.9 | 70.7 |
| | Wet | 23.8 | 25.5 | 23.6 |
| | Snow/Ice | 4.47 | 5.27 | 5.53 |
| | Slush | 0.18 | 0.19 | 0.10 |
| | Muddy | 0.09 | 0.11 | 0.10 |
| Weather | Clear | 58.1 | 58.0 | 59.3 |
| | Raining | 16.5 | 17.4 | 17.6 |
| | Snowing | 3.16 | 3.49 | 3.49 |
| | Fog/Smog/Smoke | 0.75 | 1.69 | 2.91 |
| | Sleet/Hail | 0.35 | 0.40 | 0.39 |
| | Cloudy | 21.2 | 19.0 | 16.4 |
| Road Character | Straight/Level | 60.4 | 46.7 | 58.2 |
| | Straight/Grade | 17.3 | 16.1 | 24.4 |
| | Straight/Hillcrest | 3.63 | 5.09 | 5.05 |
| | Curve/Level | 8.46 | 15.0 | 5.64 |
| | Curve/Grade | 8.54 | 14.3 | 6.22 |
| | Curve/Hillcrest | 1.59 | 2.87 | 0.49 |

TABLE 1. COMPARISON OF CRASHES ON A-A HIGHWAY WITH ALL CRASHES AND CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| VARIABLE | CATEGORY | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| | | ALL | TWO-LANE RURAL | A-A |
| Type Accident 1st Event | Collision with Non-fixed Object | | | |
| | Other Vehicle | 74.6 | 56.3 | 56.5 |
| | Pedestrian | 0.88 | 0.53 | 0.87 |
| | Bicycle | 0.48 | 0.14 | 0.39 |
| | Animal | 0.52 | 1.29 | 0.97 |
| | Train | 0.05 | 0.05 | 0.00 |
| | Deer | 3.02 | 6.80 | 18.3 |
| | Collision with Fixed Object | | | |
| | Utility Pole | 1.65 | 1.80 | 1.16 |
| | Guardrail | 1.32 | 1.67 | 4.46 |
| | Crash Cushion | 0.03 | 0.03 | 0.10\ |
| | Sign Post | 0.62 | 0.84 | 0.78 |
| | Tree | 2.32 | 4.41 | 0.19 |
| | Building/Wall | 0.31 | 0.26 | 0.10 |
| | Curbing | 0.43 | 0.16 | 0.58 |
| | Fence | 1.58 | 2.99 | 0.00 |
| | Bridge | 0.36 | 0.46 | 0.10 |
| | Culvert/headwall | 0.56 | 1.29 | 0.48 |
| | Snow embankment | 0.06 | 0.09 | 0.01 |
| | Earth embankment/ rock cut/ditch | 4.54 | 10.8 | 4.84 |
| | Fire Hydrant | 0.13 | 0.06 | 0.19 |
| | Guardrail end treatment | 0.27 | 0.38 | 1.45 |
| | Other fixed objects | 1.16 | 1.46 | 0.29 |
| | Non-collision | | | |
| | Overturned | 1.02 | 2.02 | 2.22 |
| | Fire/explosion | 0.19 | 0.25 | 0.68 |
| | Submersion | 0.02 | 0.03 | 0.00 |
| | Ran off roadway | 1.81 | 3.72 | 1.16 |
| | Other | 0.84 | 1.15 | 1.26 |

TABLE 1. COMPARISON OF CRASHES ON A-A HIGHWAY WITH ALL CRASHES AND CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| VARIABLE | CATEGORY | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| | | ALL | TWO-LANE RURAL | A-A |
| Contributing Factors (Percent of all Crashes) | Human | | | |
| | Unsafe Speed | 7.67 | 12.2 | 6.01 |
| | Failure to Yield | 15.6 | 12.9 | 13.7 |
| | Following too Close | 6.24 | 3.61 | 4.55 |
| | Improper Passing | 1.16 | 1.54 | 1.07 |
| | Disregard Traffic Control | 3.20 | 1.25 | 1.65 |
| | Improper Turn | 2.38 | 1.30 | 1.55 |
| | Alcohol Involvement | 4.38 | 5.96 | 5.14 |
| | Drug | 0.39 | 0.60 | 0.29 |
| | Sick | 0.17 | 0.21 | 0.19 |
| | Fell Asleep | 1.19 | 1.76 | 3.29 |
| | Lost Consciousness | 0.29 | 0.41 | 0.48 |
| | Driver Inattention | 33.8 | 33.1 | 21.8 |
| | Distraction | 2.15 | 2.57 | 2.81 |
| | Physical Disability | 0.23 | 0.25 | 0.10 |
| | Vehicular | | | |
| | Defective Brakes | 1.39 | 1.49 | 1.36 |
| | Lighting Defective | 0.25 | 0.50 | 0.48 |
| | Steering Defective | 0.28 | 0.48 | 0.29 |
| | Tire Problem | 0.79 | 1.21 | 1.07 |
| | Tow Hitch Defective | 0.10 | 0.11 | 0.29 |
| | Load Problem | 0.31 | 0.53 | 0.87 |
| | Environmental | | | |
| | Animal Action | 3.97 | 9.18 | 16.7 |
| | Glare | 0.82 | 1.02 | 0.68 |
| | View Obstruction | 3.22 | 3.80 | 2.62 |
| | Debris in Roadway | 0.66 | 0.85 | 1.07 |
| | Improper Traffic Control | 0.11 | 0.08 | 0.29 |
| | Defective Shoulder | 0.20 | 0.40 | 0.19 |
| | Hole/bump | 0.14 | 0.15 | 0.19 |
| | Road Construction | 0.38 | 0.30 | 0.39 |

TABLE 1. COMPARISON OF CRASHES ON A-A HIGHWAY WITH ALL CRASHES AND CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| VARIABLE | CATEGORY | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| | | ALL | TWO-LANE RURAL | A-A |
| Contributing Factors (Percent of all Crashes) | Environmental (continued) | | | |
| | Improperly Parked Vehicle | 0.29 | 0.20 | 0.29 |
| | Fixed Object | 0.20 | 0.20 | 0.00 |
| | Slippery Surface | 11.8 | 15.5 | 10.3 |
| | Water Pooling | 1.06 | 1.54 | 1.74 |
| Light Condition | Daylight | 72.6 | 67.9 | 54.1 |
| | Dawn | 1.69 | 2.26 | 3.60 |
| | Dusk | 2.62 | 2.52 | 3.12 |
| | Darkness/lighted/on | 10.7 | 3.50 | 9.93 |
| | Darkness/lighted/off | 0.88 | 0.86 | 1.27 |
| | Darkness/not lighted | 11.5 | 22.9 | 27.9 |
| Speed Limit | 35 mph or less | 49.5 | 20.1 | 12.2 |
| | 40 - 45 mph | 17.2 | 11.9 | 22.6 |
| | 50 - 55 mph | 29.5 | 68.0 | 65.2 |
| | Over 55 mph | 3.83 | 0.04 | 0.00 |
| Vehicle Type | Passenger Car | 94.3 | 93.7 | 88.0 |
| | Single Unit Truck | 1.29 | 1.44 | 2.29 |
| | Combination Truck | 2.64 | 2.97 | 8.48 |
| | Bus | 0.20 | 0.04 | 0.06 |
| | School Bus | 0.35 | 0.40 | 0.06 |
| | Motorcycle | 0.34 | 0.48 | 0.48 |
| | Emergency Vehicle | 0.27 | 0.24 | 0.24 |

TABLE 2. COMPARISON OF FATAL CRASHES ON A-A HIGHWAY WITH ALL FATAL CRASHES AND FATAL CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998)

| | | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| VARIABLE | CATEGORY | ALL | TWO-LANE RURAL | A-A |
| Directional Analysis | Intersection | | | |
| | Angle | 9.40 | 6.73 | 17.9 |
| | Rear end | 0.70 | 0.76 | 3.57 |
| | Opposing left turn | 1.13 | 0.76 | 0.00 |
| | Fixed object | 0.26 | 0.17 | 0.00 |
| | Same direction sideswipe | 0.22 | 0.08 | 0.00 |
| | Bicycle | 0.44 | 0.08 | 3.57 |
| | All Intersection | 13.9 | 9.92 | 28.6 |
| | Non-Intersection | | | |
| | Rear end | 3.05 | 1.43 | 3.57 |
| | Head on | 10.8 | 15.1 | 14.3 |
| | Same direction sideswipe | 1.65 | 1.26 | 7.14 |
| | Opposite direction sideswipe | 8.27 | 10.4 | 10.7 |
| | Driveway related | 1.96 | 1.85 | 0.00 |
| | Parked vehicle | 1.26 | 0.84 | 0.00 |
| | Pedestrian | 7.23 | 4.21 | 7.14 |
| | Fixed object | 26.2 | 27.4 | 14.3 |
| | Ran off roadway | 13.1 | 16.7 | 3.57 |
| | Overturned in road | 4.40 | 3.95 | 3.57 |
| | Bicycle | 0.70 | 0.67 | 0.00 |
| | Animal | 0.35 | 0.42 | 0.00 |
| | Train | 0.44 | 0.34 | 0.00 |
| Time of Day | Midnight - 5:59 am | 17.6 | 15.4 | 10.7 |
| | 6:00 am - 11:59 am | 22.5 | 22.4 | 25.0 |
| | Noon - 5:59 pm | 34.7 | 36.0 | 42.9 |
| | 6:00 pm - 11:59 pm | 25.3 | 26.2 | 21.4 |
| Day of Week | Monday - Friday | 69.7 | 69.7 | 64.3 |
| | Saturday - Sunday | 30.3 | 30.3 | 35.7 |

TABLE 2. COMPARISON OF FATAL CRASHES ON A-A HIGHWAY WITH ALL FATAL CRASHES AND FATAL CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| | | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| VARIABLE | CATEGORY | ALL | TWO-LANE RURAL | A-A |
| Month | December - February | 21.8 | 21.4 | 21.4 |
| | March - May | 24.2 | 24.1 | 32.1 |
| | June - August | 25.9 | 26.0 | 21.4 |
| | September - November | 28.1 | 28.4 | 25.0 |
| Number of Vehicles | One | 53.7 | 54.3 | 28.6 |
| | Two | 39.0 | 39.6 | 60.7 |
| | More than two | 7.31 | 6.06 | 10.7 |
| Land Use | Rural | 68.0 | 90.1 | 89.3 |
| | Business/Industrial | 11.9 | 4.13 | 7.14 |
| | Other | 20.1 | 5.77 | 3.57 |
| Road Surface Conditions | Dry | 77.0 | 74.5 | 82.1 |
| | Wet | 20.3 | 22.4 | 17.9 |
| | Snow/Ice/Slush | 2.70 | 3.03 | 0.00 |
| Weather | Clear | 60.5 | 59.1 | 64.3 |
| | Raining | 12.7 | 13.4 | 10.7 |
| | Snowing | 2.31 | 2.45 | 0.00 |
| | Fog/Smog/Smoke | 2.40 | 2.95 | 0.00 |
| | Sleet/Hail | 0.22 | 0.34 | 0.00 |
| | Cloudy | 21.9 | 21.8 | 25.0 |
| Road Character | Straight/Level | 39.3 | 29.5 | 50.0 |
| | Straight/Grade | 17.8 | 16.1 | 39.3 |
| | Straight/Hillcrest | 4.46 | 4.73 | 0.00 |
| | Curve/Level | 17.0 | 23.5 | 3.57 |
| | Curve/Grade | 18.6 | 22.4 | 7.14 |
| | Curve/Hillcrest | 2.80 | 3.71 | 0.00 |

TABLE 2. COMPARISON OF FATAL CRASHES ON A-A HIGHWAY WITH ALL FATAL CRASHES AND FATAL CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| | | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| VARIABLE | CATEGORY | ALL | TWO-LANE RURAL | A-A |
| Type Accident 1st Event | Collision with Non-fixed Object | | | |
| | Other Vehicle | 44.6 | 44.7 | 67.9 |
| | Pedestrian | 7.97 | 4.54 | 7.14 |
| | Bicycle | 1.13 | 0.76 | 3.57 |
| | Animal | 0.22 | 0.34 | 0.00 |
| | Train | 0.44 | 0.34 | 0.00 |
| | Deer | 0.17 | 0.17 | 0.00 |
| | Collision with Fixed Object | | | |
| | Utility Pole | 2.31 | 1.68 | 3.57 |
| | Guardrail | 2.57 | 1.77 | 0.00 |
| | Crash Cushion | 0.04 | 0.00 | 0.00 |
| | Sign Post | 1.13 | 0.93 | 0.00 |
| | Tree | 11.2 | 13.5 | 0.00 |
| | Building/Wall | 0.09 | 0.08 | 0.00 |
| | Curbing | 0.35 | 0.50 | 0.00 |
| | Fence | 2.26 | 2.44 | 0.00 |
| | Bridge | 1.35 | 1.18 | 0.00 |
| | Culvert/headwall | 2.18 | 3.53 | 0.00 |
| | Earth embankment/ rock cut/ditch | 9.84 | 12.4 | 7.14 |
| | Fire Hydrant | 0.04 | 0.08 | 0.00 |
| | Guardrail end treatment | 0.91 | 0.42 | 3.57 |
| | Other fixed objects | 1.39 | 1.09 | 0.00 |
| | Non-collision | | | |
| | Overturned | 4.53 | 4.12 | 3.57 |
| | Fire/explosion | 0.04 | 0.00 | 0.00 |
| | Submersion | 0.22 | 0.17 | 0.00 |
| | Ran off roadway | 3.31 | 4.21 | 0.00 |
| | Other | 0.96 | 0.59 | 3.57 |

TABLE 2. COMPARISON OF FATAL CRASHES ON A-A HIGHWAY WITH ALL FATAL CRASHES AND FATAL CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| VARIABLE | CATEGORY | PERCENT OF TOTAL ALL | TWO-LANE RURAL | A-A |
|---|---|---|---|---|
| Contributing Factors (Percent of all Crashes) | Human | | | |
| | Unsafe Speed | 27.2 | 30.4 | 17.9 |
| | Failure to Yield | 16.6 | 17.4 | 35.7 |
| | Following too Close | 0.44 | 0.50 | 0.00 |
| | Improper Passing | 1.13 | 1.60 | 7.14 |
| | Disregard Traffic Control | 4.35 | 3.28 | 7.14 |
| | Improper Turn | 0.48 | 0.17 | 3.57 |
| | Alcohol Involvement | 20.0 | 22.4 | 17.9 |
| | Drug | 1.83 | 2.10 | 0.00 |
| | Sick | 0.74 | 0.59 | 0.00 |
| | Fell Asleep | 3.87 | 3.11 | 10.7 |
| | Lost Consciousness | 1.04 | 1.09 | 0.00 |
| | Driver Inattention | 19.8 | 21.0 | 17.9 |
| | Distraction | 1.70 | 1.85 | 0.00 |
| | Physical Disability | 0.39 | 0.42 | 0.00 |
| | Vehicular | | | |
| | Defective Brakes | 1.00 | 0.76 | 3.57 |
| | Lighting Defective | 0.22 | 0.08 | 0.00 |
| | Steering Defective | 0.26 | 0.42 | 0.00 |
| | Tire Problem | 2.09 | 2.44 | 0.00 |
| | Load Problem | 0.17 | 0.25 | 0.00 |
| | Environmental | | | |
| | Animal Action | 0.61 | 0.93 | 0.00 |
| | Glare | 0.91 | 0.76 | 0.00 |
| | View Obstruction | 3.74 | 4.12 | 0.00 |
| | Debris in Roadway | 0.70 | 0.42 | 0.00 |
| | Improper Traffic Control | 0.13 | 0.08 | 0.00 |
| | Defective Shoulder | 0.48 | 0.50 | 0.00 |
| | Hole/bump | 0.22 | 0.17 | 0.00 |
| | Road Construction | 0.17 | 0.00 | 0.00 |
| | Improperly Parked Vehicle | 0.17 | 0.00 | 0.00 |
| | Fixed Object | 0.26 | 0.42 | 0.00 |
| | Slippery Surface | 9.80 | 11.6 | 3.57 |
| | Water Pooling | 1.35 | 1.60 | 0.00 |

TABLE 2. COMPARISON OF FATAL CRASHES ON A-A HIGHWAY WITH ALL FATAL CRASHES AND FATAL CRASHES ON TWO-LANE RURAL HIGHWAYS (1996-1998) (continued)

| | | PERCENT OF TOTAL | | |
|---|---|---|---|---|
| VARIABLE | CATEGORY | ALL | TWO-LANE RURAL | A-A |
| Light Condition | Daylight | 57.4 | 59.1 | 64.3 |
| | Dawn | 2.58 | 2.28 | 0.00 |
| | Dusk | 2.54 | 2.71 | 0.00 |
| | Darkness/lighted/on | 5.73 | 1.02 | 3.57 |
| | Darkness/lighted/off | 0.87 | 0.68 | 0.00 |
| | Darkness/not lighted | 30.9 | 34.3 | 32.1 |
| Vehicle Type | Passenger Car | 86.7 | 88.2 | 75.5 |
| | Single Unit Truck | 2.46 | 2.60 | 7.55 |
| | Combination Truck | 6.41 | 4.88 | 17.0 |
| | Bus | 0.14 | 0.06 | 0.00 |
| | School Bus | 0.42 | 0.28 | 0.00 |
| | Motorcycle | 2.34 | 2.33 | 0.00 |
| | Emergency Vehicle | 0.17 | 0.17 | 0.00 |

TABLE 3. CRASH RATES ON A-A HIGHWAY (1996-98)

| | NUMBER OF CRASHES | | | RATE (PER 100MVM) | | |
|---|---|---|---|---|---|---|
| COUNTY | TOTAL | INJURY | FATAL | TOTAL | INJURY | FATAL |
| | | | KY 9 | | | |
| Carter | 19 | 6 | 1 | 30 | 8 | 1.56 |
| Lewis | 134 | 50 | 7 | 72 | 27 | 3.76 |
| Mason | 251 | 73 | 7 | 118 | 34 | 3.30 |
| Bracken | 76 | 28 | 4 | 45 | 17 | 2.37 |
| Pendleton | 31 | 12 | 0 | 86 | 33 | 0.00 |
| Campbell | 478 | 128 | 8 | 150 | 40 | 2.51 |
| | | | KY 10 | | | |
| Lewis | 20 | 10 | 0 | 54 | 27 | 0.00 |
| Greenup | 23 | 6 | 1 | 61 | 16 | 2.67 |
| ALL | 1,032 | 313 | 28 | 97 | 30 | 2.64 |

Notes: Statewide Rates (Crashes/100MVM) (1996-98):

Rural Two-Lane: All: 252
Injury: 89
Fatal: 3.1

Rural Four-Lane Divided: (Non-Interstate) All: 114
Injury: 42
Fatal: 1.8

Total VMT Traveled on A-A Highway (100 MVM): 10.606

TABLE 4. ONE MILE RURAL SECTIONS ON A-A HIGHWAY WITH 10 OR MORE CRASHES

| COUNTY | MILEPOINT RANGE | NUMBER CRASHES | RATE (/100MVM) | CRF* |
|---|---|---|---|---|
| Bracken | KY 9<br>13.311-14.311 | 14 | 198 | 0.49 |
| Greenup | KY 10<br>10.943-11.882 | 11 | 235 | 0.53 |
| Lewis | KY 9<br>27.500-28.400 | 12 | 203 | 0.48 |
| Mason | KY 9<br>2.900-3.781 | 10 | 115 | 0.29 |
| Mason | KY 9<br>14.100-15.057 | 11 | 79 | 0.22 |
| Pendleton | KY 9<br>0.806-1.806 | 10 | 193 | 0.44 |

- CRF - critical rate factor

TABLE 5. SUMMARY OF ACCESS POINTS ON THE A-A HIGHWAY AND RIGHT OF WAY CONTROL

| | NUMBER ACCESS POINTS | | | | RIGHT OF WAY CONTROL | | |
|---|---|---|---|---|---|---|---|
| COUNTY/ ROUTE | STATE ROUTE | COUNTY/ CITY | PUBLIC ENTRANCE | PRIVATE DRIVEWAY | STOP SIGN | TRAFFIC SIGNAL | NONE |
| Carter/KY 9 | 6 | 16 | 1 | 12 | 20 | 1 | 14 |
| Lewis/KY 9 | 11 | 27 | 2 | 61 | 32 | 0 | 69 |
| Mason/KY 9 | 13 | 18 | 8 | 22 | 31 | 4 | 26 |
| Bracken/KY 9 | 7 | 13 | 0 | 13 | 20 | 0 | 13 |
| Pendleton/KY 9 | 2 | 1 | 1 | 6 | 4 | 0 | 6 |
| Campbell/KY 9 | 10 | 19 | 2 | 13 | 23 | 5 | 16 |
| Lewis/KY 10 | 5 | 9 | 2 | 19 | 13 | 0 | 22 |
| Greenup/KY 10 | 5 | 8 | 0 | 15 | 12 | 1 | 15 |
| Total | 59 | 111 | 16 | 161 | 155 | 11 | 181 |

# APPENDIX

## DESCRIPTION OF FATAL CRASHES ON A-A HIGHWAY

LOCATION OF FATAL CRASHES ON "A-A HIGHWAY"
(From 1/1/1995 through Available Data in 1999)

| CASE NUMBER | YEAR | COUNTY | ROUTE | MP | DA* |
|---|---|---|---|---|---|
| 052277 | 1995 | Carter | KY 9 | 1.078 | 01 |
| 044718 | 1999 | | | 6.500 | 30 |
| 049861 | 1997 | | | 7.991 | 28 |
| 058399 | 1995 | | | 11.324 | 01 |
| 030107 | 1998 | Lewis | KY 9 | 1.700 | 30 |
| 029108 | 1995 | | | 1.806 | 30 |
| 133877 | 1998 | | | 10.929 | 01 |
| 034627 | 1998 | | | 16.667 | 40 |
| 079573 | 1998 | | | 16.867 | 46 |
| 031001 | 1997 | | | 19.364 | 28 |
| 133501 | 1998 | | | 26.000 | 40 |
| 011249 | 1997 | | | 30.140 | 01 |
| 116771 | 1997 | Mason | KY 9 | 0.598 | 01 |
| 068192 | 1998 | | | 0.598 | 28 |
| 050973 | 1999 | | | 1.999 | 30 |
| 133825 | 1996 | | | 4.400 | 44 |
| 139607 | 1995 | | | 7.560 | 19 |
| 042222 | 1999 | | | 7.600 | 12 |
| 010382 | 1998 | | | 10.744 | 10 |
| 009558 | 1996 | | | 13.250 | 38 |
| 128769 | 1995 | | | 15.300 | 24 |
| 133804 | 1996 | | | 15.930 | 29 |
| 072551 | 1997 | | | 19.100 | 30 |
| 104973 | 1995 | | | 19.254 | 28 |
| 010926 | 1998 | Bracken | KY 9 | 2.138 | 38 |
| 038380 | 1997 | | | 2.250 | 29 |
| 133371 | 1995 | | | 2.501 | 28 |
| 049767 | 1997 | | | 3.601 | 46 |
| 005173 | 1995 | | | 12.906 | 28 |
| 126480 | 1996 | | | 15.079 | 43 |

| CASE NUMBER | YEAR | COUNTY | ROUTE | MP | DA* |
|---|---|---|---|---|---|
| 057097 | 1996 | Campbell | KY 9 | 0.877 | 28 |
| 078316 | 1998 | | | 2.524 | 40 |
| 014191 | 1997 | | | 5.847 | 09 |
| 023117 | 1997 | | | 5.847 | 30 |
| 070417 | 1998 | | | 5.847 | 04 |
| 088390 | 1995 | | | 6.200 | 44 |
| 084058 | 1997 | | | 7.111 | 02 |
| 116216 | 1997 | | | 11.700 | 25 |
| 055059 | 1996 | | | 17.852 | 16 |
| 125395 | 1996 | Greenup | KY 10 | 2.970 | 40 |
| 063692 | 1999 | | | 8.289 | 01 |

- DA is the directional analysis code which describes the type of crash.

DESCRIPTION OF FATAL CRASHES ON A-A HIGHWAY
(From 1/1/95 to Available Date in 1999 with 41 Crashes Included in the Summary)

| LOCATION | DATE | DESCRIPTION |
|---|---|---|
| Carter; MP 1.078 | 5/24/95 | Angle collision; intersection with KY 1959; pulled north from side road into path of vehicle on KY 9; noted northbound vehicle on KY 1959 must pull past stop bar to have clear view of traffic on KY 9. |
| Carter; MP 6.5 | 5/7/99 | Opposite direction sideswipe collision in which southbound truck driver crossed centerline when attempting to pass; improper passing was listed as a factor; occurred in a curve in a no passing zone; time of collision about midnight. |
| Carter; MP 7.991 | 5/11/97 | Head on collision; vehicle crossed centerline into opposing lane in 3-lane section (unknown reason); time of collision 4:15 pm; hit tractor trailer which had estimated speed of at least 62 mph. |
| Carter; MP 11.324 | 6/6/95 | Angle collision; intersection with KY 2/7; vehicle pulled into path of single unit truck on KY 9; visibility not obstructed; speed of truck estimated at least 63 mph. |
| Lewis; MP 1.700 | 4/3/98 | Head on collision; unknown why driver crossed centerline; time of collision 8:50 am. |
| Lewis; MP 1.806 | 3/24/95 | Head on collision; driver fell asleep and crossed centerline; time of collision 9:40 am. |
| Lewis; MP 10.929 | 12/3/98 | Angle collision; intersection with KY 59; southbound vehicle pulled into path of eastbound vehicle. |
| Lewis; MP 16.667 | 4/4/98 | Single vehicle hit utility pole; lost control on wet pavement in curve; speed and alcohol factors; time of crash 1:05 am on Saturday morning. |
| Lewis; MP 16.867 | 8/22/98 | Single vehicle overturned after hit guardrail; northbound driver overcorrected after running off east side of rood; speed and alcohol factors; partially ejected; dry pavement; time 5:20 pm with daylight conditions. |

| LOCATION | DATE | DESCRIPTION |
|---|---|---|
| Lewis; MP 19.364 | 4/6/97 | Head on collision; improper passing of a line of traffic which was traveling 70 mph. |
| Lewis; MP 25.600 | 11/7/98 | Head on collision; southbound driver crossed centerline for unknown reason; 9:10 am; dry pavement; straight section of road. |
| Lewis; MP 30.14 | 2/4/97 | Angle collision; intersection with KY 57; northbound vehicle pulled into path of westbound vehicle; no view obstructions; no excessive speed noted; 1:05 pm; wet pavement. |
| Mason; MP 0.598 | 11/6/97 | Angle collision; intersection with KY 1237; southbound vehicle pulled into path of westbound tractor trailer; did not stop at stop sign; 11:40 pm. |
| Mason; MP 0.598 | 7/8/98 | Angle collision; intersection with KY 1237; northbound vehicle pulled into path of eastbound truck; no view obstructions; 9:30 am. |
| Mason; MP 1.999 | 5/12/99 | Opposite direction sideswipe collision; northbound vehicle crossed into path of southbound vehicle; factors were slippery surface and limited view. |
| Mason; MP 4.400 | 11/29/96 | Single vehicle; overturned in roadway; unsafe speed listed as factor; 8:01 am. |
| Mason; MP 7.56 | 12/28/95 | Angle collision; intersection with KY 11; eastbound vehicle on KY 9 ran red light and hit northbound vehicle on KY 11; darkness with no roadway lighting. |
| Mason; MP 7.6 | 2/5/99 | Opposite direction collision; intersection with KY 11; northbound vehicle failed to yield right of way to southbound vehicle at traffic signal; darkness with roadway lighting. |
| Mason; MP 10.744 | 1/5/98 | Angle collision; intersection with Kenton Station Road; driver attempted to turn left from southbound on side street into path of westbound vehicle on KY 9. |

| LOCATION | DATE | DESCRIPTION |
|---|---|---|
| Mason; MP 13.250 | 1/11/96 | Pedestrian; nighttime with no roadway lighting. |
| Mason; MP 15.300 | 11/20/95 | Rear end; car ran into rear of tractor trailer stopped to turn into Town & Country Marathan Drive; nighttime with no roadway lighting. |
| Mason; MP 15.930 | 11/29/96 | Rear end; pickup ran into rear of single unit truck after first attempting to pass it using the emergency lane and then swerving back into the road to avoid a disabled vehicle; 5:40 pm at dusk; alcohol and drugs involved. |
| Mason; MP 19.100 | 7/13/97 | Opposite direction sideswipe collision; southbound vehicle failed to yield right of way to northbound vehicle; straight and level; dry; 2:27 pm; daylight. |
| Mason; MP 19.254 | 8/2/95 | Head on; westbound vehicle crossed centerline for unknown reason; alcohol involved; 5:54 am; dusk. |
| Bracken; MP 2.138 | 2/9/98 | Pedestrian; driver fell asleep and vehicle ran onto emergency lane hitting pedestrians; 10:30 am. |
| Bracken; MP 2.25 | 4/25/97 | Opposite direction; driver fell asleep and crossed centerline; 0:25 am; darkness with no lighting. |
| Bracken; MP 2.501 | 12/4/95 | Head on collision in curve; driver fell asleep and crossed centerline; 3:15 am. |
| Bracken; MP 3.601 | 5/13/97 | Head on collision in straight section; driver fell asleep and crossed centerline; 2:50 pm. |
| Bracken; MP 12.906 | 1/24/95 | Head on collision; mirrors on two opposing vehicles hit and driver then lost control crossing centerline and hit vehicle in opposing lane; 7:00 am; straight section of road. |
| Bracken; MP 15.079 | 11/17/96 | Single vehicle ran off road; overturned and ejected; alcohol involved; 8:35 pm; straight section of road. |

| LOCATION | DATE | DESCRIPTION |
|---|---|---|
| Campbell; MP 0.877 | 5/29/96 | Head on; driver southbound in northbound lanes; 4-lane section; alcohol involved; 9:49 pm; darkness with no roadway lighting. |
| Campbell; MP 2.224 | 8/21/98 | Single vehicle in straight section of road; hit end of guardrail and overturned; ejected; 10:11 am. |
| Campbell; MP 5.847 | 1/31/97 | Rear end at intersection with East Alexandria Pike; car ran into rear of tractor trailer; driver of truck passed exit and was going to turn around at intersection; 11:22 am. |
| Campbell; MP 5.847 | 3/8/97 | Opposing left turn; intersection with East Alexandria Pike; southbound driver turned left into path of northbound vehicle; traffic signal; 7:45 pm; darkness with no lighting. |
| Campbell; MP 5.847 | 7/20/98 | Right angle collision; intersection with East Alexandria Pike; eastbound vehicle attempted to turn left onto KY 9 and turned into path of southbound vehicle; traffic signal on flash; 4:43 pm. |
| Campbell; MP 6.266 | 3/22/95 | Single vehicle in roadway; lost control of motorcycle; steering failure; 4:39 pm. |
| Campbell; MP 7.111 | 8/10/97 | Angle collision; intersection with Poplar Ridge Road; eastbound driver attempted to turn left onto KY 9 and pulled into path of westbound tractor trailer; right of way controlled by stop sign; 10:05 am. |
| Campbell;MP 11.700 | 11/5/97 | Rear end; vehicle ran into rear of tractor trailer just starting from stop at signal; driver fell asleep; 11:32 pm; roadway lighting. |
| Campbell;MP 18.852 | 5/24/96 | DNA; intersection with 8th Street; bicycle. |
| Greenup; KY 10 MP 2.970 | 11/2/96 | Single vehicle ran off road; overturned after hitting guardrail; speed and alcohol; 10:50 pm. |
| Greenup; KY 10 MP 8.289 | 6/22/99 | Angle collision; intersection with KY 7; southbound driver failed to yield right of way to eastbound vehicle; 11:52 am. |